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The Ultimate Developers Toolkit

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Agenda

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GPU PerfStudio

GPU ShaderAnalyzer

RenderMonkey

Additional Tools

- Tootle
- GPU MeshMapper
- CubeMapGen
- The Compressonator
- OpenGL ES 2.0 Emulator

All tools available today at:
http://ati.amd.com/developer/

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GPU PerfStudio

http://ati.amd.com/developer/tools.html

GPU PerfStudio – Why use it?

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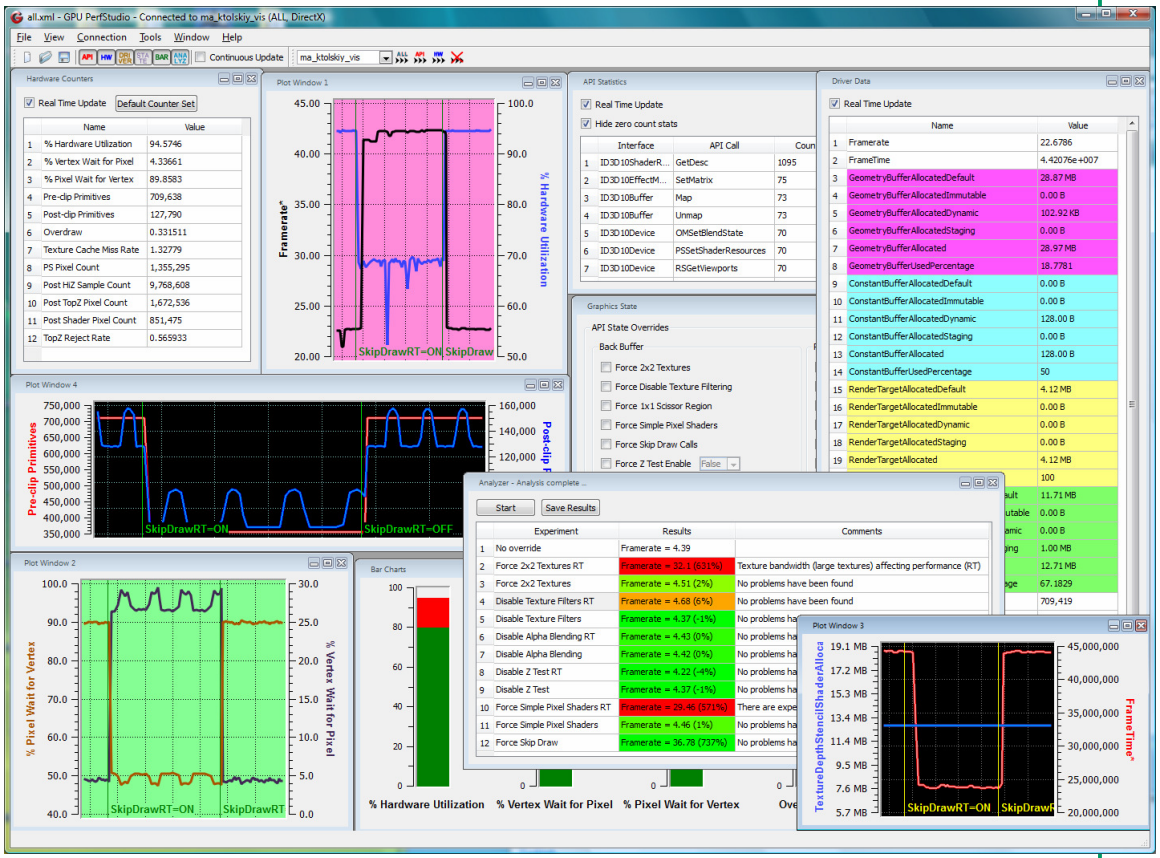
- Is the graphics performance of your game not meeting expectations?
- Are you wondering what the heck the graphics hardware is doing?

The solution is GPU PerfStudio:

- Interactive tool for enabling graphics performance optimization
- View into API, driver and hardware
- Current being used by:
  - Leading game developers
  - AMD graphics ISV Engineering team
  - AMD demo and driver teams

GPU PerfStudio

- Performance analysis and optimization tool
- Real-time visualization:
  - API statistics
  - Hardware/driver data
- Override rendering states
- Launch remote applications
- Flexible data visualization
- Bottleneck analysis



GPU PerfStudio – New Features

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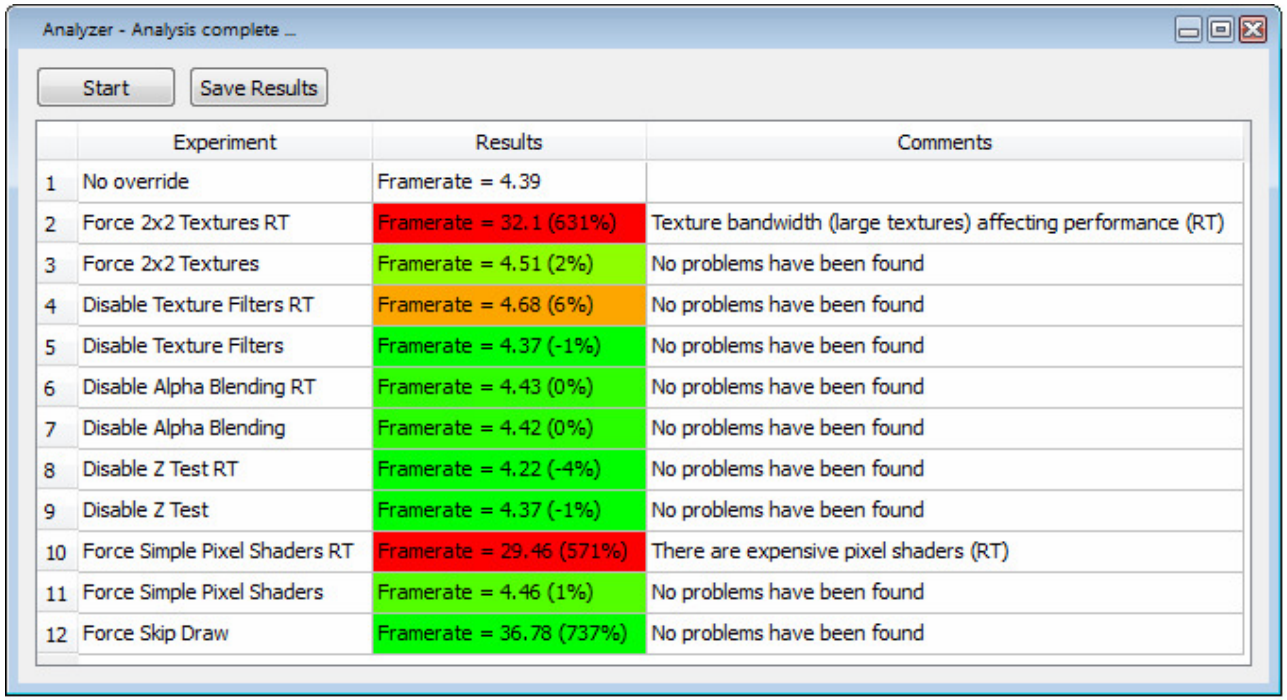
- D3D10 and OpenGL support
- ATI Radeon HD2000 and HD3000 support
- Automated bottleneck analysis:



	Experiment	Results	Comments
1	No override	Framerate = 4.39	
2	Force 2x2 Textures RT	Framerate = 32.1 (631%)	Texture bandwidth (large textures) affecting performance (RT)
3	Force 2x2 Textures	Framerate = 4.51 (2%)	No problems have been found
4	Disable Texture Filters RT	Framerate = 4.68 (6%)	No problems have been found
5	Disable Texture Filters	Framerate = 4.37 (-1%)	No problems have been found
6	Disable Alpha Blending RT	Framerate = 4.43 (0%)	No problems have been found
7	Disable Alpha Blending	Framerate = 4.42 (0%)	No problems have been found
8	Disable Z Test RT	Framerate = 4.22 (-4%)	No problems have been found
9	Disable Z Test	Framerate = 4.37 (-1%)	No problems have been found
10	Force Simple Pixel Shaders RT	Framerate = 29.46 (571%)	There are expensive pixel shaders (RT)
11	Force Simple Pixel Shaders	Framerate = 4.46 (1%)	No problems have been found
12	Force Skip Draw	Framerate = 36.78 (737%)	No problems have been found

GPU PerfStudio - Demo

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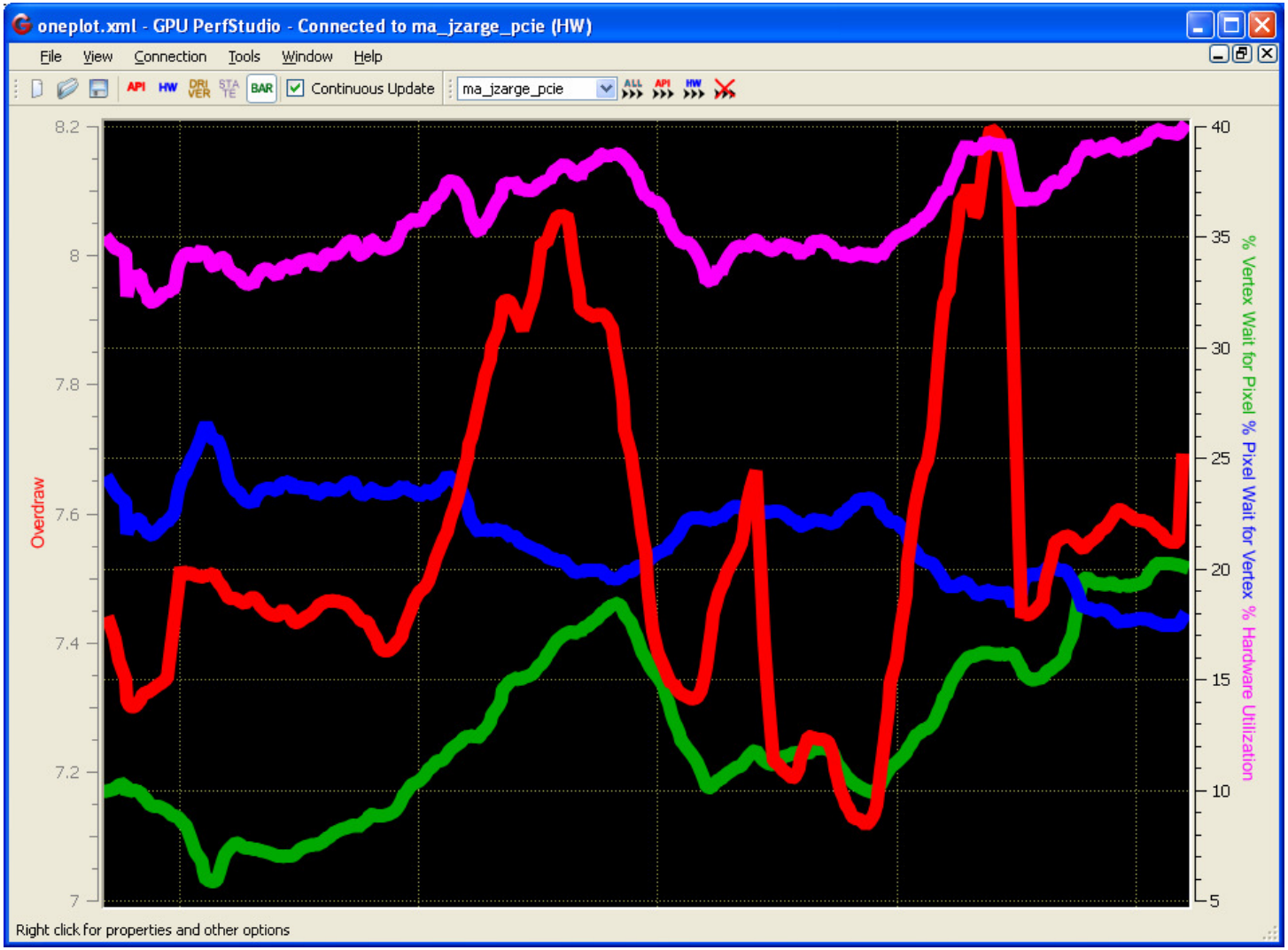

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GPU ShaderAnalyzer

http://ati.amd.com/developer/tools.html

GPU ShaderAnalyzer

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Shader performance analysis tool:

- View hardware disassembly
- Instant feedback as you tune
- Estimated cycle counts for all AMD GPUs

Support for all shading languages:

- HLSL, DX assembly
- DX9, DX10, DX10.1
- GLSL, ARB assembly
- Brook+, IL
- Vertex, fragment, and geometry shaders

GPU Shader Compilation

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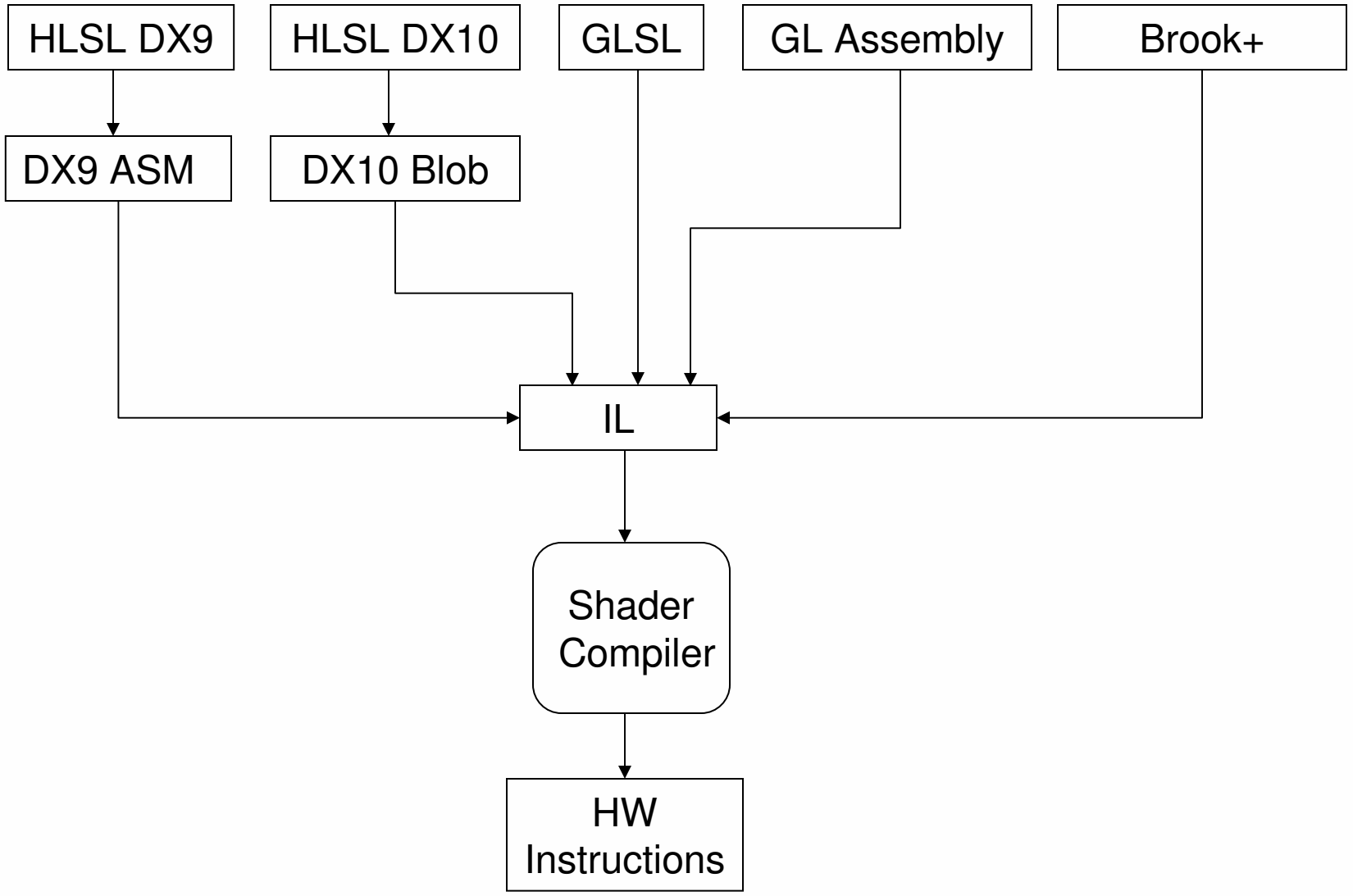

GPU ShaderAnalyzer - Demo

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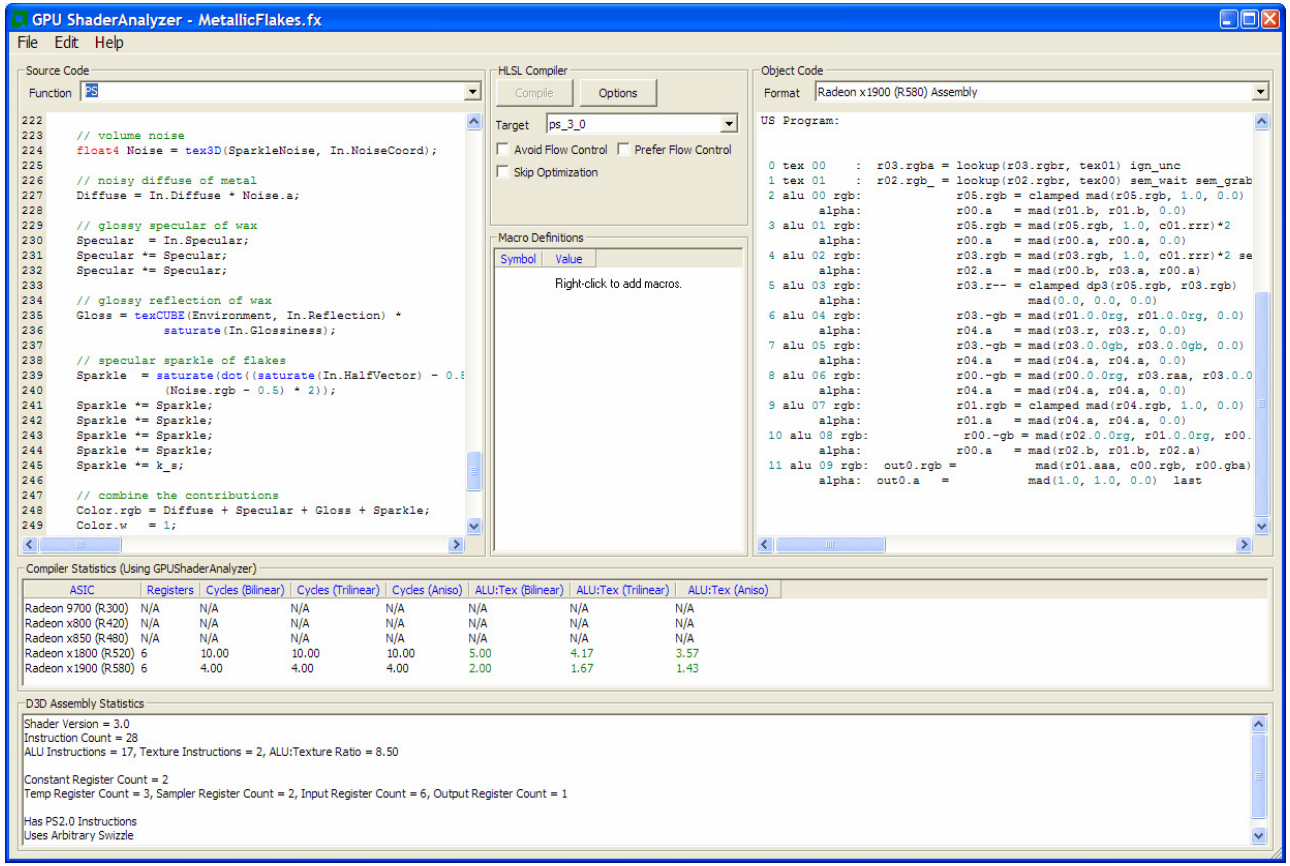

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RenderMonkey

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RenderMonkey

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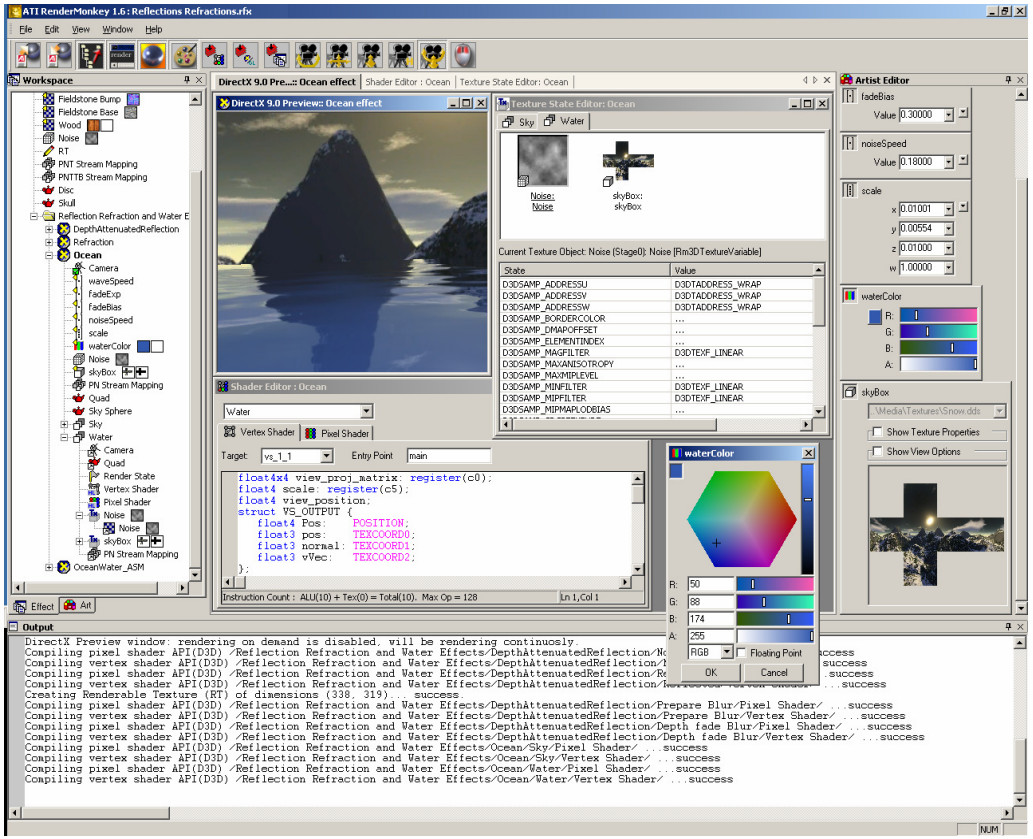
Shader Development Environment

- Rapid Prototyping of Shader Effects

Multiple Shading Languages

- DirectX HLSL
- DirectX Assembler
- OpenGL Shading Language
- OpenGL ES Shading Language



RenderMonkey – Why use it?

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Full IDE for shader effect development

- Programmer and artist view for rapid iteration

Easy integration into game pipeline

- Plug-in SDK for custom import/export
  - Effects, models, textures, variables, etc.
- Support for many standard formats
  - DDS, BMP, TGA, X, OBJ, 3DS, DAE, FX, COLLADA FX

Encompasses all effect resources

- Render state, texture state, variables, render targets, textures, models, etc…

RenderMonkey – What's new?

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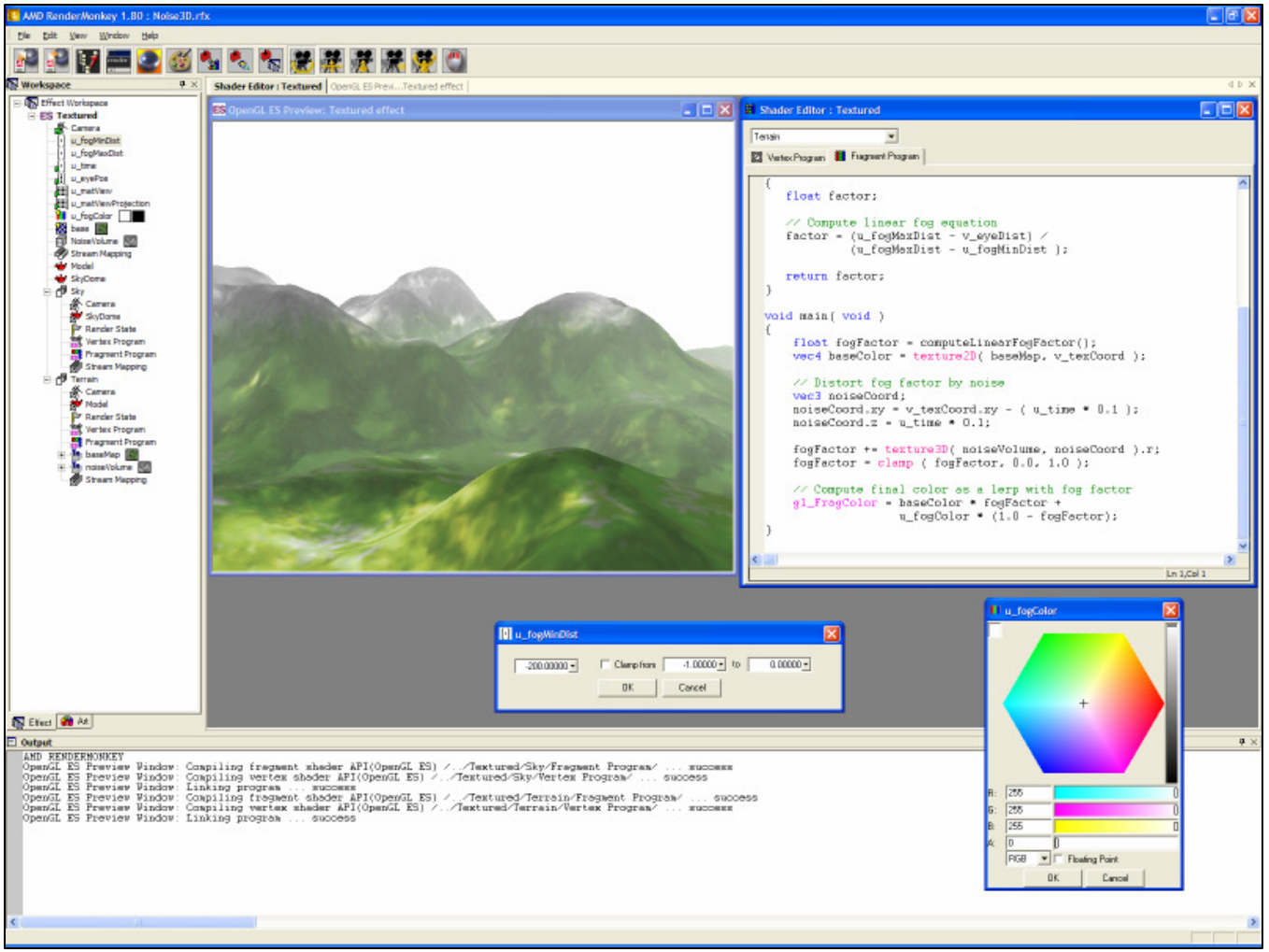
V1.7:

- Support for OpenGL ES 2.0
- ES Shading Language v1.00
- ES syntax highlighting
- ES render/sampler states
- Large suite of ES examples

V1.8:

- OpenGL COLLADA Effects Exporter
- Import COLLADA Geometry

RenderMonkey - Demo



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Additional Tools

http://ati.amd.com/developer/tools.html

Tootle

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- A Triangle Order Optimization Tool
- Provided as a library for integration into your tool-chain
- Improves vertex cache hit rate
  - Shade fewer vertices
- Reduces overdraw
  - Shade fewer pixels
  - View independent

Tootle: Overdraw Reduction

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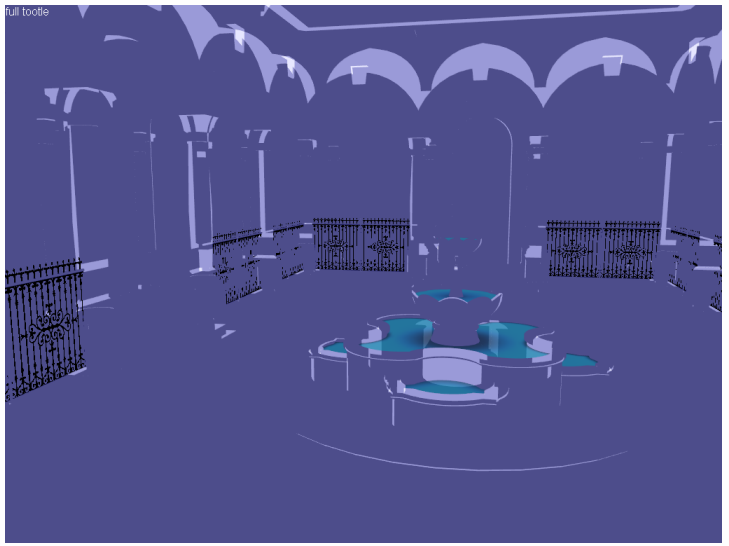
- Example Scene
  - 70k polygons
  - 10 materials
- Reduced overdraw by factor of two
- 3-7% performance increase compared to D3DXOptimizeMesh.



GPU MeshMapper

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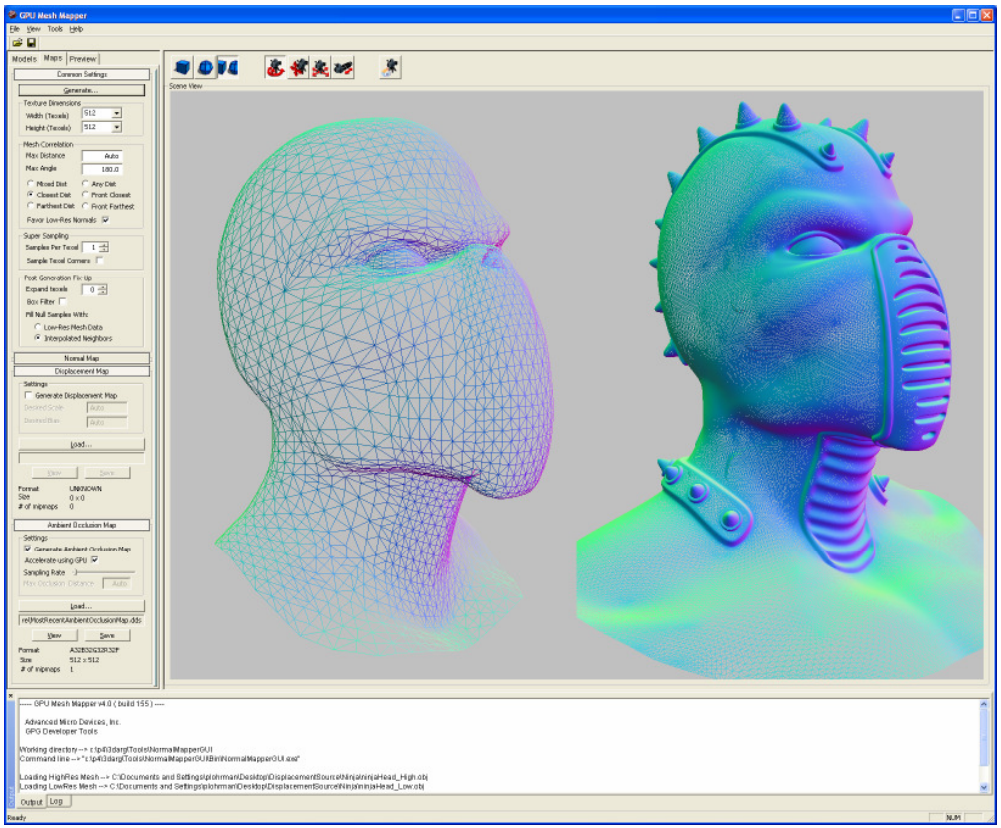
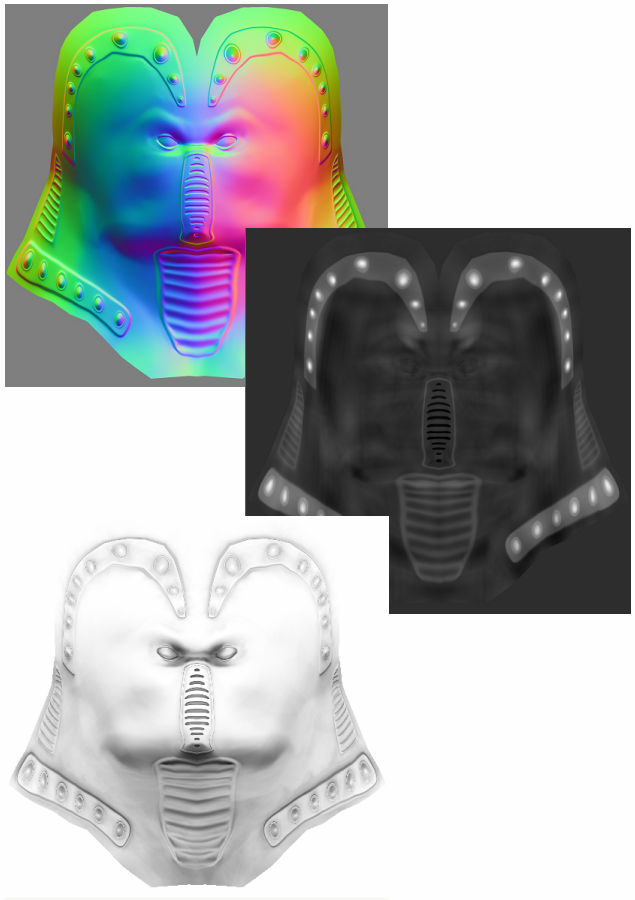
Use low and high detail models to generate normal maps, displacement maps, and ambient occlusion maps





CubeMapGen

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- Standard mip-maps
  - Filters individual faces
  - Results in artifacts

- CubMapGen mip-maps
  - Pre-filters across faces
  - Removes visible edge

- Smaller, better cube maps at no rendering cost!

The Compressonator

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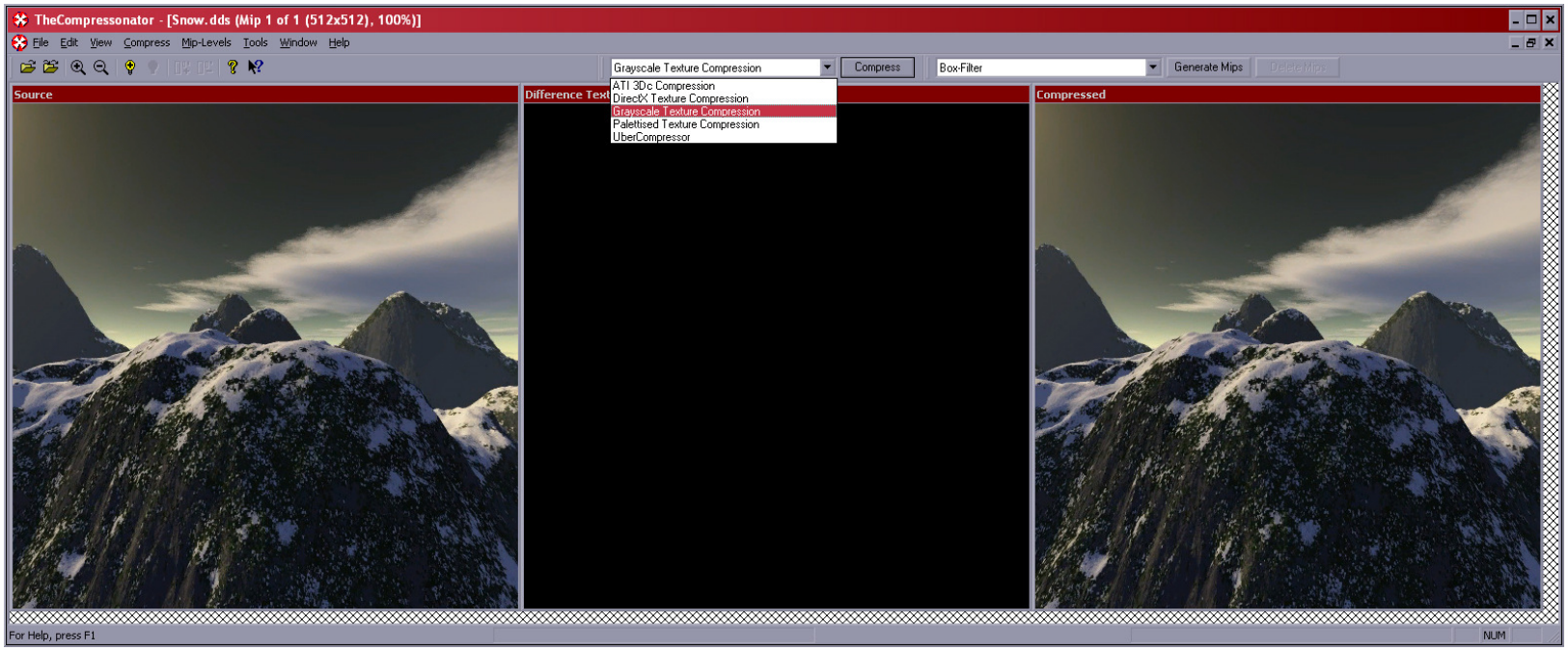
Compresses textures to all AMD-supported formats

Visual diff to assess compression quality



OpenGL ES 2.0 Emulator

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- Provides an OpenGL ES 2.0 development environment on the PC
  - Develop your OpenGL ES 2.0 applications today
  - Minimizes porting effort once hardware is available
- Full implementation of OpenGL ES 2.0 and EGL 1.3

Summary

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AMD at GDC 2008

Wednesday, February 20th Room 2015, West Hall	
9:00 – 10:00AM	**The Ultimate Developers Toolkit**: Jonathan Zarge, Dan Ginsburg
10:30 – 11:30AM	**Harnessing the Power of Multiple GPUs**: Jon Story and Holger Gruen
12:00 – 1:00PM	**Ultimate Graphics Performance for DirectX10 Hardware**: Nicolas Thibieroz
2:30 – 3:30PM	**Optimization Techniques for Attacking CPU Data Bottlenecks in PC Games**: Michael Wall
4:00 – 5:00PM	**Tessellation in a Low Poly World**: Bill Bilodeau and Peter Lohrmann

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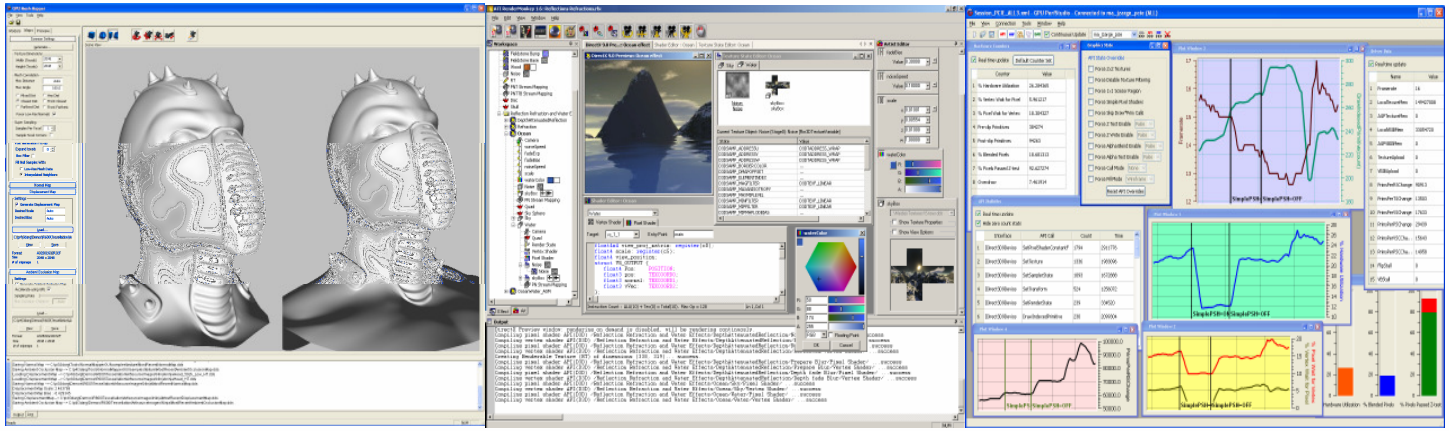
Questions?



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